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Organoleptic evaluation of parental lines and their hybrids for qualitative traits in brinjal (*Solanum melongena* L.)

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Abstract

The experiment was conducted in two *rabi* crop season, 2015-2016 and 2016-2017 in the Horticultural Experimental Farm, Assam Agricultural University, Jorhat with six Line and three Testers following L x T matting design and different qualitative traits were recorded. Among the nine parental lines only Longai has whitish pulp colour. In contrast to this eight hybrid combinations *viz.*, Utsav x JC-1, Utsav x SM-6-7, Utsav x Longai, DH x Longai, MLC-3 x Longai, MLC-1 x Longai, BM x Longai and SX x Longai were also found to have whitish pulp colour which can be exploited for commercial cultivation as whitish pulp colour variety is preferred by most of the Indian people. These crosses can be exploited for developing high quality hybrids. The F₁ hybrid combinations Utsav x JC-1, Utsav x Longai, DH x SM-6-7, MLC-3 x JC-1, MLC-3 x Longai, MLC-1 x JC-1, MLC-1 x SM-6-7, MLC-1 x Longai and BM x JC-1 showed field resistance to all the three biotic stresses like phomopsis blight, bacterial wilt and brinjal fruit and shoot borer under natural field condition which could be exploited commercially.

Keywords: Qualitative traits, hybrid combinations and brinjal

Introduction

One of the most important and popularly grown vegetable crops in India is brinjal (*Solanum melongena* L.) having chromosome number 2n=20. It is a cosmopolitan crop grown throughout the year in the India with higher productive. Hence brinjal is commonly referred as poor man's vegetable. It plays a significant role in nutritional as well as medicinal value. Only higher yield is not a prerequisite for consumer satisfaction. The consumer preference is highly variable from region to region. The varieties of *Solanum melongena* L. display a wide range of fruit shapes and colours, ranging from oval or egg-shaped to long club-shaped; and from white, yellow, green through degrees of purple pigmentation to almost black which fulfill the demand of local people. Less seeds per fruits and longer shelf life also a major aspect of quality. The resistance to biotic factors such as brinjal shoot and fruit borer, bacterial wilt, phomopsis blight etc. are the complex phenomenon which is influenced by environment, host and pathogen (Agrisio 2005) [2]. Exploitation of heterosis/hybrid vigor has become a potential tool for developing high yielding varieties or hybrids with local preference (Chadha and Sidhu, 1982) [3]. Hence present study was carried out with the objective of organoleptic evaluation of parental lines and their hybrids for qualitative traits to meet the demand of consumer preference along with higher productivity.

Materials and Methods

The present investigation was conducted at the Horticultural Experimental Farm, AAU, Jorhat with six lines and three tester following L x T mating design. The eighteen hybrids were generated using lines *viz.*, Utsav, Dari Hariharka (DH), Manipur local-3 (MLC-3), Manipur local-1 (MLC-1), Baromohiya (BM), Sagoli Xingiya (SX) and testers (Plate 1.) *viz.*, JC-1, SM-6-7, Longai. The totals of twenty seven entries were evaluated with three replication and organoleptic *i.e.* Physical and sensory appearance (Agey *et al.* 2015) [1] of leaves, stems, fruits and pulp colour.

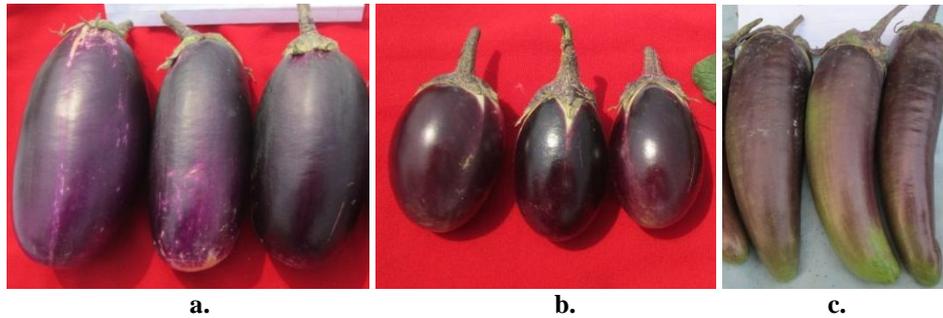


Plate 1: Tester parents (a) Longai (b) SM-6-7 (c) JC-1

1. Qualitative traits: Qualitative traits were observed visually at standard stages of plants or fruits following standard descriptors given by National Bureau of Plant Genetic Resources (NBPGR, New Delhi, 2001) except for traits fruit's pulp colour where descriptor given by International Union for the Protection of New Varieties of Plants (UPOVA, Geneva 2002) was followed.

1.1 Fruit colour: The skin colour at horticultural maturity stage of fruit was visually observed and recorded as Milky white, Green, Deep yellow, Fire red, Scarlet red, Lilac red, Purple, Purple black, Black, Light purple and other colours.

1.2 Spines on leaf: The presence or absence of spines on leaf of each entry were visually observed and recorded as absent or present.

1.3 Spines on calyx: The presence or absence of spines on calyx for each entry were visually observed and recorded as absent or present.

1.4 Pubescence on shoot: The presence or absence of pubescence on shoot of each entry were visually observed and recorded as absent and present.

1.5 Shape of fruits: The shape of fruits at Horticultural maturity harvest were visually observed and recorded as Long, Round, Oblong, Oval and Others.

1.6 Fruit's pulp colour: The harvested fruit at horticultural maturity of each entry were cut into two equal half with sharp knife longitudinally and pulp colour were visually observed and recorded as Whitish or Greenish.

2. Field resistance to phomopsis blight: The total number of plants with infected fruits was recorded in each replication on the basis of phomopsis symptomology and visually from each entry during the first picking and recorded as observed or not observed, after which the disease was adequately managed by spraying Captaf @ 3gm/lit water.

3. Field resistance to bacterial wilt: Wilt symptoms and the number of wilted plants for each entry was visually observed at vegetative stage and recorded as observed and not observed, after which the disease was adequately managed by soil drenching with Blitox @ 3gm/lit along with Crystocycline @ 0.3gm/lit water.

4. Field resistance to brinjal shoot and fruit borer: The total number of plants/fruits with borer hole was visually observed and recorded as observed or not observed, pest population were managed by foliar spraying of Corazen @ 0.5 ml/lit at 15 days interval.

Result and Discussion

Only high yielding hybrid never fulfils the consumer requirement and producer requirement. Hence quality of produce is prerequisite for fulfilment of both consumer and producer requirement. All the 27 genotypes including eighteen crosses, six lines and three testers were describe morphologically following standard descriptor for brinjal developed by National Bureau of Plant Genetics Resources (NBPGR, New Delhi) and International Union of Protection of New Plant Variety (UPOV, Geneva) for different qualitative characters presented in Table 1. In regard to fruit colour, fruit shape and spines on calyx are the most important traits which influence the people preference. The acceptance of any types of fruit totally depends on region. The peoples of Assam, and South Karnataka preferred purple colour long spineless fruits, and purple colour oval spiny fruits respectively. Hence, out of eighteen hybrids, the hybrids DH x JC-1 and DH x Longai for Assam and MLC-3xSM-6-7 and MLC-1 x SM-6-7 for Karnataka region may be suitable. Almost all hybrids were found to have pubescence on shoot except the hybrids DH x JC-1, DH x SM-6 and DH x Longai. The spines on leaves were present only in hybrids Utsav x SM-6-7, MLC-3 x SM-6-7, MLC-1 x SM-6-7 and SX x SM-6-7 whereas remaining hybrids should the lack of spines. Eight hybrids viz., Utsav x JC-1, Utsav x SM-6-7, Utsav x Longai, DH x Longai, MLC-3 x Longai, MLC-1 x Longai, BM x Longai and SX x Longai were found to have whitish pulp colour (Plate 2.) which can be exploited for commercial cultivation as whitish pulp colour variety is preferred by most of the Indian people. Biotic factor is most important constraints in production of brinjal. The hybrids Utsav x JC-1, Utsav x Longai, DH x SM-6-7, MLC-3 x JC-1, MLC-3 x Longai, MLC-1 x JC-1, MLC-1 x SM-6-7, MLC-1 x Longai and BM x JC-1 MLC-3 x SM-6-7, and BM x SM-6-7 were observed to be field resistant to phomopsis blight, bacterial wilt and brinjal fruit and shoot borer. Such hybrids can be utilized for region specific cultivation. Hence we can conclude that developing varieties/ hybrid combinations of higher yielding potential along with the desirable quality of produce fulfil the consumer demand and minimum losses during storage, marketing and transport.

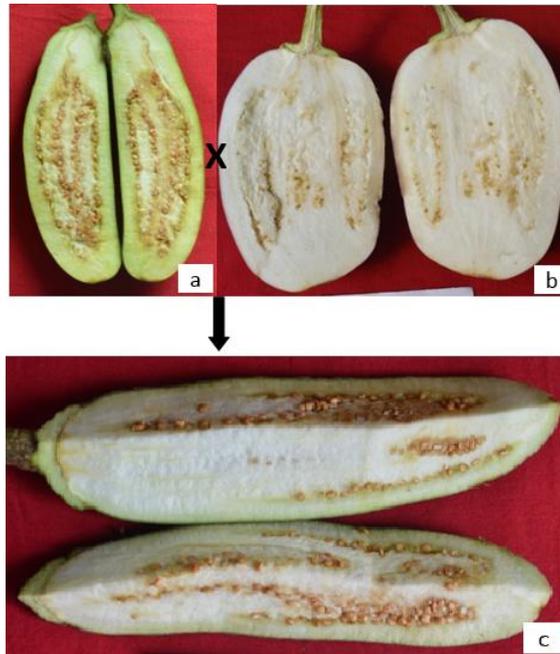


Plate 2: Pulp colour of parents (a) MLC-1 (b) Longai and their hybrid (c) MLC-1 x Longai.

Table 1: Performance of lines, testers and crosses for different qualitative traits

Genotype	FC	SOL	SOC	POS	SOF	FPC	FRPB	FRSFB	FRBW
Testers									
JC-1	Purple with green tip	Absent	Absent	Present	Long	Greenish	observed	Observed	Not observed
SM-6-7	Purple	Present	Present	Absent	Oval	Greenish	Not observed	Observed	Not observed
Longai	Purple black	Absent	Present	Present	Oblong	Whitish	Not observed	Observed	Not observed
Lines									
Utsav	Green with white stripe	Absent	Absent	Present	Long	Greenish	Not observed	Not observed	Not observed
Dari Hariharka	Green	Absent	Absent	Absent	Long	Greenish	Observed	Not observed	Observed
MLC-3	Purplish green	Absent	Present	Present	Long	Greenish	Not observed	Not observed	Not observed
MLC-1	Purplish green	Absent	Present	Present	Long	Greenish	Not observed	Not observed	Not observed
Baromohiya	Purple	Absent	Present	Absent	Long	Greenish	Not observed	Not observed	Not observed
Sagoli Xingiya	Purple	Absent	Present	Absent	Long	Greenish	Observed	Observed	Not observed
Crosses									
Utsav x JC-1	Green with light purple	Absent	Absent	Present	Long	Whitish	Not observed	Not observed	Not observed
Utsav x SM-6-7	Purple green mixed	Present	Absent	Present	Oval	Whitish	Not observed	Observed	Not observed
Utsav x Longai	Light purple	Absent	Present	Present	Oblong	Whitish	Not observed	Not observed	Not observed
DH x JC-1	Light purple	Absent	Absent	Absent	Long	Greenish	Observed	Observed	Observed
DH x SM-6-7	Purple with green	Absent	Absent	Absent	Oval	Greenish	Not observed	Not observed	Not observed
DH x Longai	Purple	Absent	Absent	Absent	Long	Whitish	Observed	Observed	Observed
MLC-3 x JC-1	Purple	Absent	Present	Present	Long	Greenish	Not observed	Not observed	Not observed
MLC-3 x SM-6-7	Purple	Present	Present	Present	Oval	Greenish	Not observed	Observed	Not observed
MLC-3 x Longai	Purple	Absent	Present	Present	Oblong	Whitish	Not observed	Not observed	Not observed
MLC-1 x JC-1	Purple with green	Absent	Present	Present	Long	Greenish	Not observed	Not observed	Not observed
MLC-1 x SM-6-7	Purple with light purple tip	Present	Present	Present	Oval	Greenish	Not observed	Not observed	Not observed
MLC-1 x Longai	Light purple	Absent	Present	Present	Oblong	Whitish	Not observed	Not observed	Not observed
BM x JC-1	Light purple	Absent	Present	Present	Long	Greenish	Not observed	Not observed	Not observed
BM x SM-6-7	Purple	Absent	Present	Absent	Oblong	Greenish	Not observed	Observed	Not observed
BM x Longai	Green with purple mixed	Absent	Present	Present	Oblong	Whitish	Observed	Not observed	Not observed
SX x JC-1	Purple	Absent	Present	Present	Long	Greenish	Observed	Observed	Not observed
SX x SM-6-7	Purple	Present	Present	Absent	Long	Greenish	Not observed	Observed	Not observed
SX x Longai	Purple black	Absent	Present	Present	Long	Whitish	Observed	Observed	Not observed

FC: Fruit colour, SOL: Spine on leaf, SOC: Spine on calyx, POS: Pubescence on shoot, SOF: Shape of fruit, FPC: Fruit pulp colour, FRPB: Field resistance to phomopsis blight, FRSFB: Field resistance to shoot and fruit borer, FRBW: Field resistance to bacterial wilt.

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